Department of Energy
Idaho Operations Office
1955 Fremont Avenue
Idaho Falls, ID 83415

April 25, 2007

Mr. Bill Rogers
Stationary Source Permit Program Coordinator
Idaho Department of Environmental Quality
1410 North Hilton
Boise, ID 83706

SUBJECT: Idaho Nuclear Technology and Engineering Center Standby Air Compressor COM-TTI-616 Permit to Construct Application at the Idaho National Laboratory (OS-ETSD-07-055)

Dear Mr. Rogers:

The U.S. Department of Energy – Idaho Operations Office and CH2M-WG Idaho, LLC are submitting a Permit to Construct (PTC) application for a standby air compressor. The air compressor, COM-UTI-616 is located at the Idaho Nuclear Technology and Engineering Center (INTEC). A CD with the modeling files is included with the application.

Also, enclosed is a check for $1,000.00 for the PTC application fee per IDAPA 58.01.01.224 and two certification statements per IDAPA 58.01.01.123.

If you have any questions please contact Jim Tkachyk at (208) 526-7965 or me at (208) 526-5670.

Sincerely,

Tim Safford
DOE-ID
Environmental Technical Support Division

Enclosure
1. COM-UTI-616 Compressor PTC application (2)
2. Check for $1,000.00
3. Certification Statements per IDAPA 58.01.01.123 (2)

cc:
R. Owen, DEQ Idaho Falls

REGULATORY CERTIFICATION [IDAPA 58.01.01.123]

STANDBY AIR COMPRESSOR COM-UTI-616
PERMIT TO CONSTRUCT APPLICATION
(RPT-290)

The undersigned certifies as required per IDAPA 58.01.01.123 as follows:

Based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.

Operator Signature

D. Brent Rankin Date: 3/29/2007

D. Brent Rankin, Vice President ESH&Q
CH2M WG, LLC.

REGULATORY CERTIFICATION [IDAPA 58.01.01.123]

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Owner Signature

Elizabeth D. Sellers, Manager
Department of Energy Idaho Operations Office

Date: 4/29/07

IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY

1410 North Hilton
Boise, Idaho 83706-1253

RECEIPT

05/03/07
DATE

RECEIVED FROM CH2M-WG

SOURCE
Cash ☐ Check ☑ Money Order ☐ No. 402312

DESCRIPTION	AMOUNT OF PAYMENT
PTC Application Fee	1000 00
72C 023-00001	
72C 011-00022	

RECEIVED BY JK

TOTAL RECEIVED 1000 00

PID	OBS	CA	SUB-OBJ	WP	BE

№ 82810

RPT-290
Rev. 1

Idaho Nuclear Technology and Engineering Center Standby Air Compressor COM-UTI-616 Permit to Construct Application at the Idaho National Laboratory

April 2007

Idaho Cleanup Project

CH2M•WG Idaho, LLC is the Idaho Cleanup Project contractor for the U.S. Department of Energy

RPT-290
Rev. 1

Idaho Nuclear Technology and Engineering Center Standby Air Compressor COM-UTI-616 Permit to Construct Application at The Idaho National Laboratory

April 2007

Idaho Cleanup Project
Idaho Falls, Idaho 83415

Prepared for the
U.S. Department of Energy
Assistant Secretary for Environmental Management
Under DOE Idaho Operations Office
Contract DE-AC07-05ID14516

ABSTRACT

The purpose of this permit to construct is to apply to the Idaho Department of Environmental Quality for a permit to operate an existing diesel-fueled standby (for emergency or backup use) air compressor (COM-UTI-616). Compressor COM-UTI-616 will provide backup compressed air supply capacity for upset and emergency conditions and provide more operational flexibility for maintenance and routine operations of the compressed air system at the Idaho Nuclear Technology and Engineering Center. Compressor COM-UTI-616 is not listed in the Idaho National Laboratory Site Title V Air Permit. Electrical compressors have provided the regular supply of compressed air. Compressor COM-UTI-616 is restricted to operate no more than 150 hours per month under Idaho Administrative Procedures Act 58.01.01.222.01 without obtaining a permit to construct. The 150-hour-per-month operating restriction does not provide the operational flexibility required by current facility operations. This application requests an annual operational limit of 5,000 hours.

Compressor COM-UTI-616 potential to emit air pollutants was determined to exceed the significance level of oxides of nitrogen specified in the Idaho Administrative Procedures Act 58.01.01.006.89. Therefore, an application for a permit to construct is required by Idaho Administrative Procedures Act 58.01.01.200. This application meets State of Idaho air permitting requirements of the Idaho Administrative Procedures Act 58.01.01.200–228 for Compressor COM-UTI-616.

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FIGURES

TABLES

Idaho Nuclear Technology And Engineering Center Standby Air Compressor COM-UTI-616 Permit to Construct Application at the Idaho National Laboratory

1. IDAHO NUCLEAR TECHNOLOGY AND ENGINEERING CENTER STANDBY AIR COMPRESSOR COM-UTI-616 APPLICATION

The purpose of this permit to construct application is to meet State of Idaho air permitting requirements of Idaho Administrative Procedures Act (IDAPA) 58.01.01.200–228 for the backup diesel standby Air Compressor COM-UTI-616 in the Idaho Nuclear Technology and Engineering Center (INTEC) compressed air distribution system. The estimated potential nitrogen oxide emissions during extended operating hours from Compressor COM-UTI-616 exceed the 40-ton-per-year significant emissions rate established in IDAPA 58.01.01.006. Therefore, a permit to construct is required to operate above the 150-hour-per-month level for exemption from air permitting for a 400-to-600-horsepower engine. Estimated air emissions are presented and analyzed in Section 3, and summarized in Section 4 of this document.

This application to the Idaho Department of Environmental Quality (DEQ) is for a permit to construct for the existing diesel-fueled Compressor COM-UTI-616 to provide compressed air during upset and emergency conditions, as well as provide greater operational flexibility for maintenance and routine operations of the compressed air system at INTEC. Electrically driven air compressors normally provide compressed air at INTEC. An exemption from obtaining a permit to construct for Compressor COM-UTI-616 would restrict it to 150 hours of operation per month. This restriction does not provide the operational flexibility required by current facility operations. This application proposes to increase the allowable hours of operation from a maximum of 150 hours per month to 5,000 hours per year.

Compressor COM-UTI-616 potential to emit air pollutants was determined to exceed the significance level for oxides of nitrogen Therefore, an application for a permit to construct is required by IDAPA 58.01.01.200. This application meets State of Idaho air permitting requirements of IDAPA 58.01.01.200–228. The application is submitted to be processed as identified in IDAPA 58.01.01.209.05.a. Therefore, applicable requirements contained in the permit to construct will be incorporated into the Tier I Operating Permit when it is renewed.

1.1 Project Location

Compressor COM-UTI-616 is located at the Idaho National Laboratory (INL) Site, which is a restricted-access, government-owned facility that covers over 2,305 km^2 (890 mi^2) in southeastern Idaho. The INL Site is on the Snake River Plain. The average elevation at the INL Site is approximately 1,520 m (5,000 ft) above sea level. The INTEC is located in the south-central portion of the INL Site (see Figure 1) in Butte County. Figure 2 shows the location of Compressor COM-UTI-616.

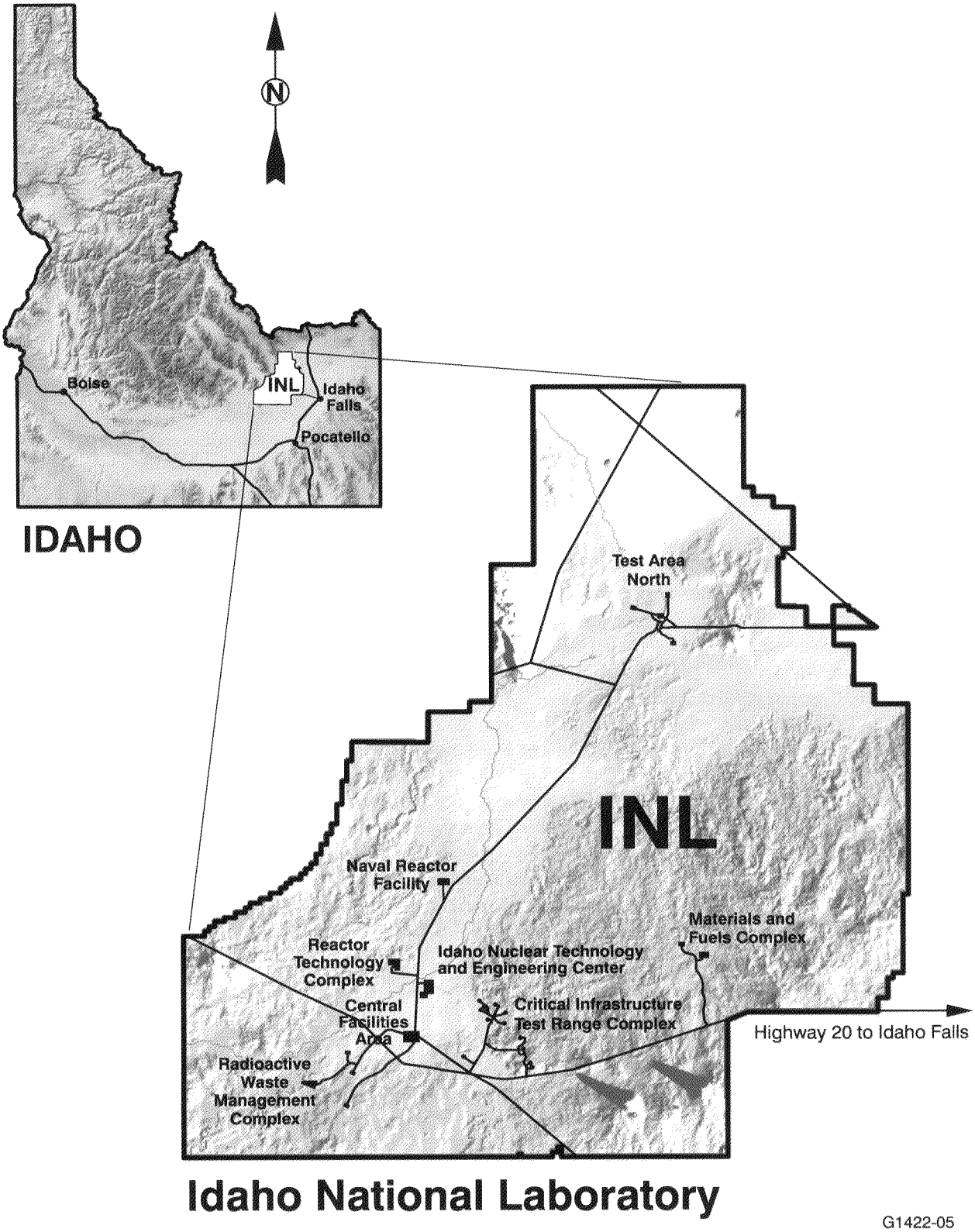

Figure 1. Idaho National Laboratory Site.

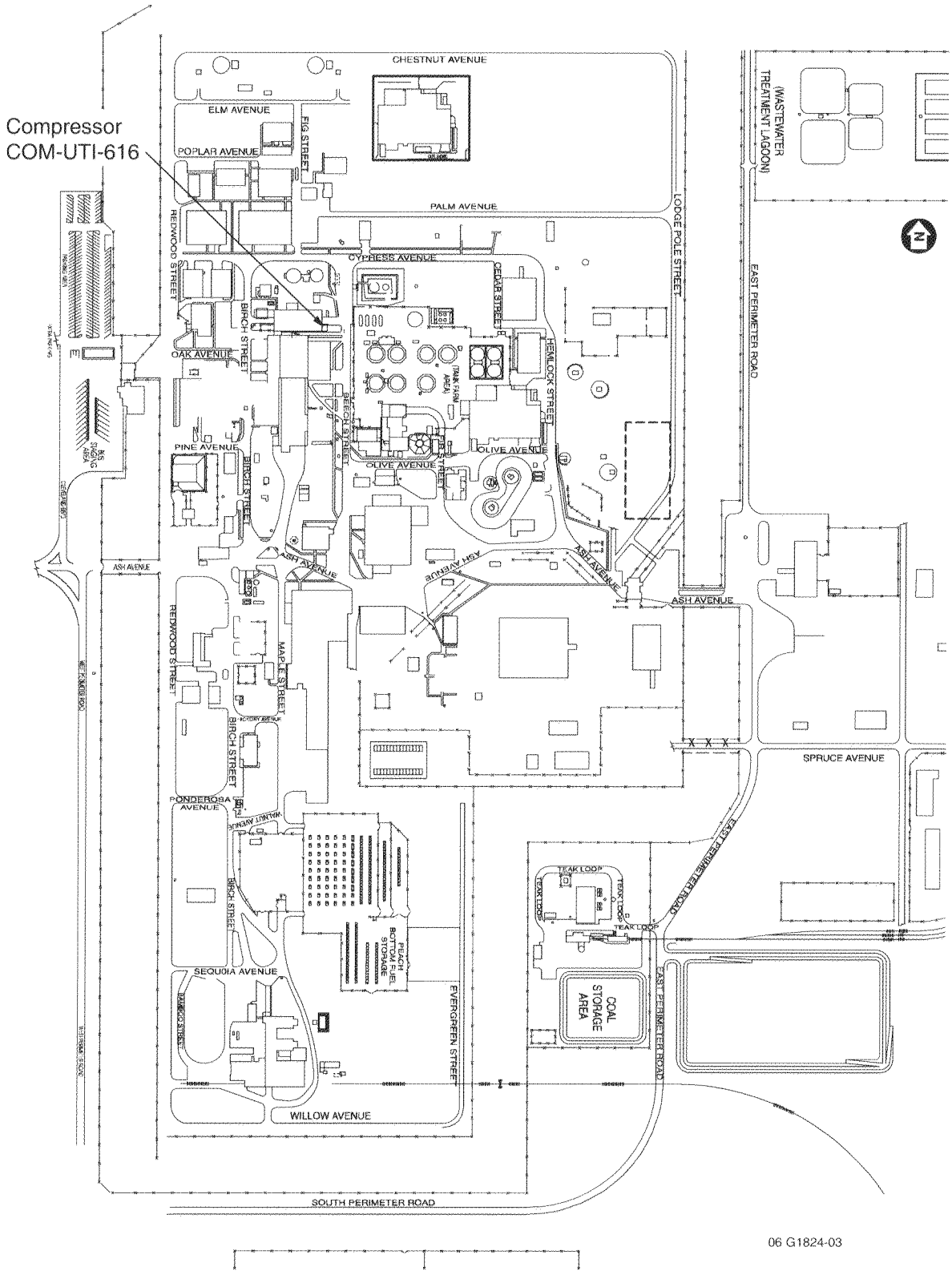

Figure 2. Location of Compressor COM-UTI-616 at the Idaho Nuclear Technology and Engineering Center.

2. PROCESS AND SOURCE DESCRIPTION

The operating function of the compressed air distribution system is to provide reliable compressed air that meets safety requirements set forth in U.S. Department of Energy orders and national codes and standards. The major compressed air distribution lines provide compressed air from CPP-606 to facilities throughout INTEC. Compressed air at the supplied pressure of approximately 125 psig is used in pulsers, jets, and for general plant use. Part of the 125-psig plant air is reduced to 50 psig plant air and used in spargers and control valves, electro-pneumatic instruments, bubblers, and airlifts throughout INTEC.

Unique safety features are implemented when compressed air fails at INTEC. The INTEC processes are designed to fail-safe upon loss of compressed air. Passive protective systems are used, where possible, so systems do not depend on other air sources. Therefore, when compressed air is lost, process operations and transfers stop, and INTEC processes stabilize into a fail-safe mode. When compressed air is restored, the processes require deliberate actions to restart, and some systems must be checked for contamination from the shutdown. Compressor COM-UTI-616 provides a redundant source of standby, backup, and emergency compressed air.

Standby compressed air may be used for process instrumentation that is used for damage control or continuity of process operation. Damage control is usually associated with accidental property loss. Damage control also includes other processes, such as sanitary sewer lift station and freeze protection for service waste systems. Continuity of operations includes systems used to meet the U.S. Department of Energy consent order for INTEC operations.

Compressor COM-UTI-616 supplies 115 psig of filtered air to the compressed air system when electric power is not available to the regularly used air compressors. Compressor COM-UTI-616 is outside CPP-616, which is located at the southeastern corner of CPP-606, as shown in Figure 2.

Figure 3 shows Compressor COM-UTI-616. Description details are as follows:

- Type—Stationary rotary screw, oil-flooded compressor
- Manufacturer—Ingersoll-Rand
- Date manufactured—February 1997
- Model number—XP-1400WCU
- Compressed air capacity—1,400 scfm at 115 psig
- Power source—Cummins diesel-fueled internal combustion engine
- Horsepower—460 horsepower at 1,800 rpm according to manufacturer's data plate for the Cummins Model N14-C diesel engine.

Figure 3. Stationary Standby Air Compressor COM-UTI-616.

3. REGULATORY REQUIREMENTS

3.1 Idaho Administrative Procedures Act 58.01.01.200, Procedures and Requirements for Permits to Construct

This section addresses the proposed modification's compliance with the IDAPA 58.01.01.200 procedures and requirements for permits to construct. The proposed modification is limited by the maximum potential emissions summarized in Table 1.

The potential to emit for all criteria pollutants with no hourly limits (8,760 hr/yr) was calculated. Nitrogen oxides (NO_x) were the only pollutants exceeding the significance criteria at 62.46 ton/yr. Applicable pollutant annual emissions increases were calculated based on appropriate emission factors from U.S. Environmental Protection Agency (EPA) AP-42 (EPA 1996). To operate Compressor COM-UTI-616, INTEC has chosen to request an enforceable operation limit of 5,000 hr/yr, which is greater than that allowed by a Category II exemption. Based on a requested permit operation limit of 5,000 hr/yr, the resulting emissions increase is less than the applicable IDAPA 58.01.01.006.89 significant emissions rate for nitrogen oxides of 40 ton/yr, as shown in Table 1. A prevention of significant deterioration analysis is not required because federally enforceable limits that prevent emissions from exceeding the IDAPA 58.01.01.006.89 significant levels and the major modification threshold of 40 CFR Part 52.21(b) will be established in the proposed limit as requested in this permit application.

Table 1. Internal combustion engine parameters.

Pollutant	AP-42 Emission Factor of Diesel Industrial Engines[a] (lb/hp-hr)	Diesel Engine Horsepower Rating[b] (hp)	Short-Term Potential Emissions[c] (lb/hr)	Long-Term Potential Emissions[d] (ton/yr)	Maximum Operational Scenario[e] (ton/yr)	IDAPA 58.01.01.006 Significant Emission Rate (ton/yr)
NO_x	3.10E-02	460	14.26	62.46	**35.65**[f]	**40**
CO	6.68E-03	460	3.07	13.46	**7.68**	**100**
SO_2 (as SOx)[g]	2.05E-03	460	0.94	4.13	**2.36**	**40**
Particulate[h]	2.20E-03	460	1.01	4.43	**2.53**	**25**
PM-10[h]	2.20E-03	460	1.01	4.43	**2.53**	**15**
VOC as a measure of ozone (as TOC)	2.51E-03	460	1.16	5.07	**2.89**	**40**

a. AP-42, *Emission Factors for Uncontrolled Gasoline and Diesel Industrial Engines*, Table 3.3-1 (EPA 1996).

b. Horsepower rating from manufacturer's data plate mounted on the engine.

c. Short-term potential emissions = AP-42 emission factor × horsepower rating.

d. Long-term potential emissions = short-term emissions (lb/hr) × maximum operational scenario (8,760 hr/yr) × 1 ton/2,000 lb.

e. Maximum operational scenario based on enforceable operational limits proposed in this application (i.e., 5,000 hr/yr).

f. Bold values represent emissions used to compare to regulatory limit (also in bold).

g. The EPA AP-42 emission factor is represented as SOx. Therefore, to compare with IDAPA limits, SOx is conservatively assumed to be SO_2.

h. All particulate is assumed to be ≤1 μm based on EPA AP-42, Table 3.3-1. Consequently, both PM-10 and particulate are the same.

As Table 1 shows and as Appendix A calculations demonstrate, this source does not constitute a major modification. The following subsections demonstrate compliance with the following requirements in IDAPA 58.01.01, Sections 200–223:

- IDAPA 58.01.01.201, "Permit to Construct Required"
- IDAPA 58.01.01.202, "Application Procedures"
- IDAPA 58.01.01.202.01.a, "Application Procedures — Required Information"
- IDAPA 58.01.01.202.02, "Estimates of Ambient Concentrations"
- IDAPA 58.01.01.202.03, "Additional Information"
- IDAPA 58.01.01.203, "Permit Requirements for New and Modified Stationary Sources"
- IDAPA 58.01.01.210, "Demonstration of Preconstruction Compliance with Toxic Standards."

As described in the remainder of this section, the proposed modification complies with the applicable requirements of IDAPA 58.01.01.200.

3.1.1 IDAPA 58.01.01.201, Permit to Construct Required

No owner or operator may commence construction or modification of any stationary source, facility, major facility, or major modification without first obtaining a permit to construct from the Department which satisfies the requirements of Sections 200 through 228 unless the source is exempted in any of Sections 220 through 223, or the owner or operator complies with Section 213 and obtains the required permit to construct or the owner or operator complies with Sections 175 through 181, or the source operates in accordance with all of the applicable provisions of a permit by rule. (4-11-06)

Modification Compliance: Pending DEQ issuance of a permit to construct, Compressor COM-UTI-616 will be used for emergency, standby, and backup purposes within current exemptable limits.

3.1.2 IDAPA 58.01.01.202, Application Procedures

Application for a permit to construct must be made using forms furnished by the Department, or by other means prescribed by the Department. The application shall be certified by the responsible official in accordance with Section 123 and shall be accompanied by all information necessary to perform any analysis or make any determination required under Sections 200 through 228. (7-1-02)

Modification Compliance: The DEQ application forms are provided in Appendix B. Previous INL permit to construct applications followed the general format used in this application and were acceptable to DEQ. This submittal is accompanied with a certification in accordance with IDAPA 58.01.01.123. This application contains all required information for DEQ to perform an analysis and determination.

3.1.3 IDAPA 58.01.01.202.01.a, Application Procedures—Required Information

01. Required Information. *Depending upon the proposed size and location of the new or modified stationary source or facility, the application for a permit to construct shall include all of the information required by one or more of the following provisions: (5-1-94)*

a. For any new or modified stationary source or facility: (5-1-94)

i. Site information, plans, descriptions, specifications, and drawings showing the design of the stationary source, facility or modification, the nature and amount of emissions (including secondary emissions), and the manner in which it will be operated and controlled. (5-1-94)

Modification Compliance: This application contains information required for DEQ to perform an analysis and make the determinations as required by IDAPA 58.01.01.200–228. The information includes site information, descriptions, specifications of the units comprising the modification, nature and amount of emissions (including secondary emissions), and the manner in which the units will be operated and controlled.

ii. A schedule for construction of the stationary source, facility, or modification. (5-1-94)

Modification Compliance: The permitted annual hours of operation will become effective when a permit to construct is issued.

3.1.4 IDAPA 58.01.01.202.02, Estimates of Ambient Concentrations

All estimates of ambient concentrations shall be based on the applicable air quality models, data bases, and other requirements specified in 40 CFR 61, Appendix W (Guideline on Air Quality Models). (4-5-00)

Modification Compliance: Estimates of ambient concentrations in this application are based on EPA's air quality model AERMOD (ISC-AERMOD 2007) and modeling results (included in supporting information).

3.1.5 IDAPA 58.01.01.202.03, Additional Information

Any additional information, plans, specifications, evidence or documents that the Department may require to make the determinations required under Sections 200 through 225 shall be furnished upon request. (5-1-94)

Modification Compliance: Additional information will be provided to DEQ upon request.

3.1.6 IDAPA 58.01.01.203, Permit Requirements for New and Modified Stationary Sources

No permit to construct shall be granted for a new or modified stationary source unless the applicant shows to the satisfaction of the Department all of the following: (5-1-94)

01. Emission Standards. *The stationary source or modification would comply with all applicable local, state or federal emission standards. (5-1-94)*

Modification Compliance: Applicable emissions standards addressed in this section are as follows:

- IDAPA 58.01.01.006.89 compliance is demonstrated in Section 3.1. Table 1 compares emissions increases with the IDAPA 58.01.01.006.89 significant emission rates
- IDAPA 58.01.01.006.90 compliance is evaluated in Table 2 and the following "NAAQS" discussion
- IDAPA 58.01.01.585–586 compliance is evaluated in the "Demonstration of Preconstruction Compliance with Toxic Standards" discussion in Section 3.1.7
- IDAPA 58.01.01 general emissions standards are addressed in Section 3.2 of this application.

Table 2. Ambient air quality analysis.

Pollutant (averaging period)	Short-Term Potential Emissions[a] (lb/hr)	Maximum Unit Release Factor[b] ($\mu g/m^3$ per lb/hr)	Source Contribution Increase[c,d] ($\mu g/m^3$)	Significant Contribution Threshold[d] ($\mu g/m^3$)
SO_2 (annual)[e]	0.54	0.54	**0.3**	**1.0**
SO_2 (24-hour)	0.94	2.69	**2.5**	**5**
SO_2 (3-hour)	0.94	6.06	**5.7**	**25**
NO_2 (annual)[e]	8.14	NA[f]	**0.13**	**1.0**
CO (8-hour)	3.07	4.71	**14.5**	**500**
CO (1-hour)	3.07	6.73	**20.7**	**2,000**
PM-10 (annual)[e]	0.58	0.54	**0.3**	**1.0**
PM-10 (24-hour)	1.01	2.69	**2.7**	**5**

a. Short-term potential emissions taken from Table 1, except for annual averages (see Note e).

b. Maximum unit release factor taken from SCREEN3 (EPA 1995) modeling output times appropriate persistence factors from State of Idaho Air Quality Modeling Guidance (ID-AQ-011 [DEQ 2002]).

c. Source contribution increase = (short-term potential emissions) × (maximum unit release factor), except for NO_2, which is based on AERMOD (ISC-AERMOD 2007) modeling output provided in supporting information.

d. Bold numbers are the ambient concentrations used to compare to regulatory thresholds (also in bold).

e. Calculated as an annual arithmetic mean based on proposed permitted operating scenario of 5,000 hours per year [(i. e., (ton/yr value from Table 1) × (1 yr/5,000 hr) × (2,000 lb/1 ton)].

f. NA—Not applicable. NO_2 concentration was modeled using AERMOD from emission rate directly (see Note c and supporting information).

02. NAAQS. *The stationary source or modification would not cause or significantly contribute to a violation of any ambient air quality standard (5-1-94)*

Modification Compliance: In accordance with DEQ guidance on previous INL permit to construct application submittals, ambient concentration increases will be demonstrated to not exceed the significant contribution thresholds of IDAPA 58.01.01.006.90. If the significant contribution thresholds are not exceeded, then the National Ambient Air Quality Standards analysis is considered complete. Calculations are provided in Appendix A. Concentration increases are based on maximum unit release factors generated by the SCREEN3 code (EPA 1995); 1-hour average concentrations from the SCREEN3 code

are adjusted to appropriate averaging times by multiplying by appropriate persistence factors. Because the SCREEN3 result for NO_2 exceeded the significant contribution threshold, the more refined AERMOD model (ISC-AERMOD 2007) was used to demonstrate compliance for NO_2.

The potential ambient concentration increases do not exceed the significant contribution thresholds of IDAPA 58.01.01.006.90. Table 2 compares the ambient concentration increases with the significant contribution thresholds. The potential hourly emissions used in this analysis are based on the compressor's maximum design of a 460-hp engine rating and will ensure the modification complies with the short-term averages. Emissions calculations and model results using potential emissions demonstrate that the annual average significant contribution thresholds are not exceeded. Therefore, the proposed maximum annual hours of operation (5,000 hr/yr) will ensure the modification will not exceed the annual average thresholds.

03. Toxic Air Pollutants. *Using the methods provided in Section 210, the emissions of toxic air pollutants from the stationary source or modification would not injure or unreasonably affect human or animal life or vegetation as required by Section 161. Compliance with all applicable toxic air pollutant carcinogenic increments and toxic air pollutant non-carcinogenic increments will also demonstrate preconstruction compliance with Section 161 with regards to the pollutants listed in Sections 585 and 586. (6-30-95)*

Modification Compliance: Compliance with this requirement is demonstrated in Section 3.1.7.

3.1.7 IDAPA 58.01.01.210, Demonstration of Preconstruction Compliance with Toxic Standards

In accordance with Subsection 203.03, the applicant shall demonstrate preconstruction compliance with Section 161 to the satisfaction of the Department. The accuracy, completeness, execution and results of the demonstration are all subject to review and approval by the Department. (6-30-95)

Modification Compliance: Ambient impacts of toxic air pollutants will be less than the increments listed in IDAPA 58.01.01.585–586. In accordance with IDAPA 58.01.01.203.03, this ensures that no toxic substances will be emitted in such quantities or concentrations as to alone, or in combination with other contaminants, injure or unreasonably affect human or animal life or vegetation.

EPA AP-42, Section 3.3 emission factors identify 24 noncriteria air pollutant emissions generated by large stationary diesel engines (EPA 1996). Ten of these pollutants are IDAPA 58.01.01.585 and .586 toxic air pollutants. Preconstruction compliance with the toxic standards is demonstrated by IDAPA 58.01.01.210.05 (Uncontrolled Emissions) methods or IDAPA 58.01.01.210.06 (Uncontrolled Ambient Concentrations) methods.

IDAPA 58.01.01.210.05 (Uncontrolled Emissions). The uncontrolled emissions are based on the combined maximum design of the 460-hp diesel engine operating 5,000 hr/yr. The uncontrolled toxic air pollutant emissions for acrolein, naphthalene, toluene, xylenes, acetaldehyde, and benzo(a)pyrene do not exceed their applicable screening emission levels. Therefore, these toxic air pollutant emissions satisfy IDAPA 58.01.01.210.05 requirements, and no further procedures for demonstrating preconstruction compliance are required. Table 3 compares the emissions with the applicable emission limits. Appendix A contains sample calculations.

Table 3. Toxic air pollutant analysis.

Pollutant	AP-42 Emission Factor[a] (lb/MMBtu)	AP-42 Emission Factor Conversion[b] (lb/hp-hr)	Diesel Engine Horsepower Rating[c] (hp)	Potential Emission[d] (lb/hr)	IDAPA Screening Emission Level[e] (lb/hr)	Potential Ambient Concentration[f] ($\mu g/m^3$)	AACC[g] ($\mu g/m^3$)
Acrolein	9.25E-05	6.48E-07	460	**2.98E-04**[h]	**0.017**	NA	NA
Naphthalene	8.48E-05	5.94E-07	460	**2.73E-04**	**3.33**	NA	NA
Toluene	4.09E-04	2.86E-06	460	**1.32E-03**	**25**	NA	NA
Xylenes	2.85E-04	2.00E-06	460	**9.18E-04**	**29**	NA	NA
Acetaldehyde[i]	7.67E-04	5.37E-06	460	**2.47E-03**	**3.00E-03**	NA	NA
Benzene[i]	9.33E-04	6.53E-06	460	3.00E-03	8.00E-04	**8.11E-04**	**1.20E-01**
Benzo(a)pyrene[i]	1.88E-07	1.32E-09	460	**6.05E-07**	**2.00E-06**	NA	NA
1,3-Butadiene[i]	3.91E-05	2.74E-07	460	1.26E-04	2.40E-05	**3.40E-05**	**3.60E-03**
Formaldehyde[i]	1.18E-03	8.26E-06	460	3.80E-03	5.10E-04	**1.03E-03**	**7.70E-02**
Polycyclic[i] aromatic hydrocarbons	1.68E-04	1.18E-06	460	5.41E-04	2.0E-06	**1.46E-04**	**3.0E-04**

a. From Table 3.3-2 of AP-42 (EPA 1996).

b. Conversion to lb/hp-hr using an average brake-specific fuel consumption of 7,000 Btu/hp-hr from AP-42 Table 3.3-1. lb/hp-hr = AP-42 emission factor (lb/MMBtu) × (1 MMBtu/1E+06 Btu) × (7,000 Btu/hp-hr).

c. Horsepower rating from manufacturer's data plate mounted on the engine.

d. Potential emissions = AP-42 emission factor (lb/hp-hr) × horsepower rating.

e. Screening emission levels from IDAPA 58.01.01.585 and 586.

f. Only those pollutants with potential emissions exceeding the IDAPA screening emission limits were modeled for ambient impact analysis. For other compounds, NA (not applicable) was entered in this column. Potential ambient emissions (µg/m3) = potential emissions (lb/hr) × maximum unit release concentration factor of 0.27 µg/m3 per lb/hr. Maximum unit release factor to INL boundary calculated from SCREEN3 modeling output in supporting information times appropriate carcinogenic annual persistence factor of 0.125 (see ID AQ-011 [DEQ 2002]).

g. Acceptable ambient concentration for carcinogenic (AACC) toxic air pollutants from IDAPA 58.01.01.586.

h. Bold numbers are the emission rates and ambient concentrations used to compare to regulatory limits (also in bold).

i. Regulated as a carcinogenic toxic air pollutant in IDAPA 58.01.01.586.

IDAPA 58.01.01.210.06 (Uncontrolled Ambient Concentrations). As Table 3 shows, the carcinogenic toxic air pollutant emissions for benzene, 1,3-butadiene, formaldehyde, and total polyaromatic hydrocarbons exceed their applicable emission limits. Therefore, the uncontrolled ambient concentration impact is evaluated. The applicable toxic air pollutant emission rates listed in Table 3 are used to model ambient concentrations. An evaluation of the ambient impacts found that these carcinogenic toxic air pollutants do not exceed their applicable acceptable ambient concentration for carcinogens. Therefore, the impact of these toxic air pollutants complies with IDAPA 58.01.01.210.06 requirements, and no further procedures for demonstrating preconstruction compliance are required. Table 3 compares the ambient concentrations with the acceptable ambient concentrations for carcinogens. Appendix A contains sample calculations.

3.2 General IDAPA 58.01.01 Limits and Standards

3.2.1 IDAPA 58.01.01.577, Ambient Air Quality Standards for Specific Air Pollutants (PM-10, SO_x, O_3, NO_x, CO, F, Pb)

Modification Compliance: As discussed in Section 3.1.6 and shown in Table 2, the ambient concentration increases are not considered a significant contribution to ambient air quality. Fluoride and lead emissions were not calculated because there are no appropriate AP-42 emission factors. Table 2 compares the modification's ambient concentration increases with the significant contribution limits. Based on DEQ (2002), no further analysis is required.

3.2.2 IDAPA 58.01.01.578, Designation of Attainment, Unclassifiable, and Nonattainment Areas

Modification Compliance: The area impacted by the proposed modification is designated as attainment or unclassifiable for all criteria air pollutants.

3.2.3 IDAPA 58.01.01.590, New Source Performance Standards

The owner or operator of any stationary source shall comply with 40 CFR 60 as applicable to the stationary source.

Modification Compliance: Compressor COM-UTI-616 was manufactured in 1997, has not been modified, and is not subject to 40 CFR 60 requirements.

3.2.4 IDAPA 58.01.01.591, National Emission Standards for Hazardous Air Pollutants

The owner or operator of any stationary source shall comply with 40 CFR 61 and 40 CFR 63 as applicable to the stationary source.

Modification Compliance: Compressor COM-UTI-616 in this permit application is not subject to 40 CFR 61 or 40 CFR 63 National Emission Standards for Hazardous Air Pollutants regulations.

3.2.5 IDAPA 58.01.01.625, Visible Emissions

A person shall not discharge any air pollutant into the atmosphere from any point of emission for a period or periods aggregating more than three (3) minutes in any sixty (60) minute period which is greater than twenty percent (20%) opacity as determined by this section.

Modification Compliance: Visible emissions from the Compressor COM-UTI-616 stack will not exceed the visible emissions standard. Stack opacity will be evaluated periodically to ensure compliance with the standard.

3.2.6 IDAPA 58.01.01.651, General Rules

All reasonable precautions shall be taken to prevent particulate matter from becoming airborne.

Modification Compliance: All emissions from the engine are released through the exhaust stack. No controls are expected or required to control emissions.

3.2.7 IDAPA 58.01.01.728, Distilled Fuel Oil

No person shall sell, distribute, use or make available for use, any distillate fuel oil containing more than the following percentages of sulfur:

ASTM Grade 1. ASTM Grade 1 fuel oil — 0.3 percent by weight.

ASTM Grade 2. ASTM Grade 2 fuel oil — 0.5 percent by weight.

Modification Compliance: Compressor COM-UTI-616 will be restricted to the use of American Society for Testing and Materials (ASTM) Grades 1 and/or 2 diesel fuel.

3.2.8 IDAPA 58.01.01.775, Rules for the Control of Odors

...control odorous emissions from all sources for which no gaseous emission control rules apply,

Modification Compliance: Odorous air emissions from Compressor COM-UTI-616 are not expected.

4. EMISSIONS SUMMARY

4.1 Prevention of Significant Deterioration Evaluation

The proposed increase in operating hours for Compressor COM-UTI-616 meets all prevention of significant deterioration criteria for significant levels and increment consumption.

4.2 Criteria Pollutants of Concern

Based on analysis, the increase in operating hours for Compressor COM-UTI-616 -UTI meets all criteria pollutant limits. Table 2 of Section 3.1.6 provides comparisons.

4.3 State Toxics

Based on analysis, the increase in operating hours for Compressor COM-UTI-616 meets all toxic air pollutant criteria. Table 3 of Section 3.1.7 provides comparisons.

5. REFERENCES

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EPA, 1996, *Compilation of Air Pollution Emission Factors*, Fifth Edition, AP-42, Volume I: "Stationary Point and Area Sources," Section 3.3, Supplement B, U.S. Environmental Protection Agency, October 1996.

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IDAPA 58.01.01.578, 1994, "Designation of Attainment, Unclassifiable, and Nonattainment Areas," Idaho Administrative Procedures Act.

IDAPA 58.01.01.585, 1995, "Toxic Air Pollutants Non-Carcinogenic Increments," Idaho Administrative Procedures Act.

IDAPA 58.01.01.586, 2001, "Toxic Air Pollutants Carcinogenic Increments," Idaho Administrative Procedures Act.

IDAPA 58.01.01.590, 2000, "New Source Performance Standards," Idaho Administrative Procedures Act.

IDAPA 58.01.01.591, 1994, "National Emission Standards for Hazardous Air Pollutants," Idaho Administrative Procedures Act.

IDAPA 58.01.01.625, 2000, "Visible Emissions," Idaho Administrative Procedures Act.

IDAPA 58.01.01.651, 1994, "General Rules," Idaho Administrative Procedures Act.

IDAPA 58.01.01.728, 1994, "Distilled Fuel Oil," Idaho Administrative Procedures Act.

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Appendix A

Supporting Calculations

Appendix A

Supporting Calculations

Table 1 Calculation Example

Short-Term Potential Emissions

NO_x

From AP-42, the emission factor (EF) for NO_x for an internal combustion engine is 0.031 lb/hp-hr.

During the short term, the maximum emission for 1 hour is the emission factor times the rated horsepower, as shown in Equation (1):

$$E_{\text{short term}} = (EF) \times (HP_{\text{rated}}) = 0.031 \text{ lb/hp-hr} \times 460 \text{ hp} = 14.26 \text{ lb/hr} \quad . \qquad (1)$$

Long-Term Potential Emissions

NO_x

From Equation (1), the short-term maximum emission for 1 hour is 14.26 lb/hr.

There are 8,760 hr/yr.

The annual maximum potential to emit is calculated using Equation (2):

$$14.26 \text{ lb/hr} \times 8{,}760 \text{ hr/yr} \times 0.0005 \text{ ton/lb} = 62.46 \text{ ton/yr} \quad . \qquad (2)$$

Potential Emissions from Maximum Operational Scenario

NO_x

From Equation (1), the short-term maximum emission for 1 hour is 14.26 lb/hr.

The site will limit engine operations to 5,000 hr/yr.

The annual maximum potential to emit based on the operation limit is calculated using Equation (3):

$$14.26 \text{ lb/hr} \times 5{,}000 \text{ hr/yr} \times 0.0005 \text{ ton/lb} = 35.65 \text{ ton/yr} \quad . \qquad (3)$$

The calculation is repeated for CO, SO_2, particulate matter, particulate matter less than 10 microns in diameter, and volatile organic carbon.

Table 2 Calculation Example

Short-Term Potential Emissions

SO_2

From AP-42, the emission factor is 2.05E-03 lb/hp-hr for SO_X.

Equation (4) shows the calculation:

$E_{\text{short term}}$ = (2.05E-03 lb/hp-hr) (460 hp) (5,000 hr/yr-actual)/(8760 hr/yr)
= 0.54 lb/hr actual emissions. (4)

Source Contribution Increase

SO_2

From Equation (4), the short-term emission for 1 hr is 0.54 lb/hr.

From modeling files in supporting information, the ambient impact concentration unit release for INTEC for annual effect is 6.73μg/m^3 per lb/hr.

The calculated potential increase of the ambient air concentration is given in Equation (5):

0.54 lb/hr × 6.73 μg/m^3 per lb/hr × 0.08 (annual persistence factor for criteria air pollutants)
= 0.29 μg/m^3 . (5)

Table 3 Calculation Example

Potential Emissions

Formaldehyde

From AP-42, the emission factor (EF) for formaldehyde for an internal combustion engine is 0.00118 lb/MMBtu.

The potential emission is the emission factor times the rated horsepower, as shown in Equation (6):

$E_{\text{short term}} = (EF) \times (HP_{\text{rated}})$

= 0.00118 lb/MMBtu × 7,000 Btu/hp-hr × 1E-06 MMBtu/Btu × 460 hp = 0.00380 lb/hr . (6)

Source Contribution Increase

Formaldehyde

From Equation 6, the emission for 1 hr is 0.00380 lb/hr.

From modeling files in supporting information, the ambient impact concentration unit release for INTEC for annual effect for a carcinogen is 2.158μg/m^3 per lb/hr.

The calculated potential increase of the ambient air concentration is calculated using Equation 7:

0.0038 lb/hr × 2.158 μg/m^3 per lb/hr × 0.125 (annual persistence factor for carcinogenic pollutants)
= 1.03E-03 μg/m^3 . (7)

The calculation is partially repeated for acrolein, naphthalene, toluene, xylenes, acetaldehyde, and benzo(a)pyrene, where the emission rate is less than the screening emission rate and no further check is required. The calculation is fully repeated for benzene, 1,3-butadiene, and total polycyclic aromatic hydrocarbon.

Appendix B

State of Idaho Department of Environmental Quality
Application to Construct
Forms

DEQ AIR QUALITY PROGRAM
1410 N. Hilton
Boise, ID 83706
For assistance: 208-373-0502

PERMIT TO CONSTRUCT APPLICATION

Applicants, please see instructions on page 2 before filling out the form.

DEQ Staff, please see instructions for handling this form on page 3.

COMPANY NAME, FACILITY NAME, AND FACILITY ID NUMBER			
1. Company Name	U.S. Department of Energy Idaho Operations Office		
2. Facility Name	Idaho National Laboratory (INL)- Idaho Nuclear Technology and Engineering Center	3. Facility ID No.	023-00001, 011-00022
4. Brief Project Description - One sentence or less	Operate Standby Air Compressor		

PERMIT APPLICATION TYPE

5. ☐ New Facility ☐ New Source at Existing Facility ☒ Unpermitted Existing Source
☐ Modify Existing Source: Permit No.:_____ Date Issued:_____
☐ Required by Enforcement Action: Case No.:_____

6. ☒ Minor PTC ☐ Major PTC

FORMS INCLUDED

Included	N/A	Forms	DEQ Verify
☒	☐	Form GI – Facility Information	☐
☐	☒	Form EU0 – Emissions Units General	☐
☒	☐	Form EU1 - Industrial Engine Information Please Specify number of forms attached: _____	☐
☐	☒	Form EU2 - Nonmetallic Mineral Processing Plants Please Specify number of forms attached: _____	☐
☐	☒	Form EU3 - Spray Paint Booth Information Please Specify number of forms attached: _____	☐
☐	☒	Form EU4 - Cooling Tower Information Please Specify number of forms attached: _____	☐
☐	☒	Form EU5 – Boiler Information Please Specify number of forms attached: _____	☐
☐	☒	Form HMAP – Hot Mix Asphalt Plant Please Specify number of forms attached: _____	☐
☐	☒	Form CBP - Concrete Batch Plant Please Specify number of forms attached: _____	☐
☐	☒	Form BCE - Baghouses Control Equipment	☐
☐	☒	Form SCE - Scrubbers Control Equipment	☐
☒	☐	Forms EI-CP1-EI-CP4 - Emissions Inventory– criteria pollutants (Excel workbook, all 4 worksheets)	☐
☐	☒	PP – Plot Plan	☐
☒	☐	Forms MI1-MI4 – Modeling (Excel workbook, all 4 worksheets)	☐
☒	☐	Form FRA – Federal Regulation Applicability	☐

DEQ USE ONLY
Date Received
Project Number
Payment / Fees Included? Yes ☐ No ☐
Check Number

DEQ AIR QUALITY PROGRAM
1410 N. Hilton
Boise, ID 83706
For assistance: (208) 373-0502

General Information **Form GI**

PERMIT TO CONSTRUCT APPLICATION

Please see instructions on page 2 before filling out the form.

All information is required. If information is missing, the application will not be processed.

IDENTIFICATION	
1. Company Name	U. S. Department of Energy Idaho Operations Office
2. Facility Name (if different than #1)	Idaho National Laboratory (INL) - Idaho Nuclear Technology and Engineering Center
3. Facility I.D. No.	023-00001, 011-00022
4. Brief Project Description:	Operate Standby Air Compressor
FACILITY INFORMATION	
5. Owned/operated by: (√ if applicable)	☒ Federal government ☐ County government ☐ State government ☐ City government
6. Primary Facility Permit Contact Person/Title	Robyn McCollum
7. Telephone Number and Email Address	(208) 526-4631 Robyn.McCollum@icp.doe.gov
8. Alternate Facility Contact Person/Title	Tim Safford
9. Telephone Number and Email Address	(208) 526-5670 SAFFORT@ID.DOE.GOV
10. Address to which permit should be sent	1955 Fremont Avenue
11. City/State/Zip	Idaho Falls, ID 83415
12. Equipment Location Address (if different than #9)	Idaho Nuclear Technology and Engineering Center
13. City/State/Zip	Idaho Falls, ID 83415
14. Is the Equipment Portable?	☐ Yes ☒ No
15. SIC Code and NAISC Code	SIC: 9511 Secondary SIC (if any): 8733 NAICS:
16. Brief Business Description and Principal Product	Multipurpose national laboratory
17. Identify any adjacent or contiguous facility that this company owns and/or operates	None
PERMIT APPLICATION TYPE	
18. Specify Reason for Application	☐ New Facility ☐ New Source at Existing Facility ☐ Modify Existing Source: Permit No.:_____ Date Issued: _____ ☒ Unpermitted Existing Source: ☐ Required by Enforcement Action: Case No.:
CERTIFICATION	
IN ACCORDANCE WITH IDAPA 58.01.01.123 (RULES FOR THE CONTROL OF AIR POLLUTION IN IDAHO), I CERTIFY BASED ON INFORMATION AND BELIEF FORMED AFTER REASONABLE INQUIRY, THE STATEMENTS AND INFORMATION IN THE DOCUMENT ARE TRUE, ACCURATE, AND COMPLETE.	
19. Responsible Official's Name/Title	Elizabeth D. Sellers/DOE-ID and Robert Iotti, President, CH2M-WG Idaho, LLC
20. RESPONSIBLE OFFICIAL SIGNATURE	Date:
21. ☒ Check here to indicate you would like to review a draft permit prior to final issuance.	

Emissions Units – Industrial Engine Information **Form EU1**

PERMIT TO CONSTRUCT APPLICATION

DEQ AIR QUALITY PROGRAM
1410 N. Hilton
Boise, ID 83706
For assistance: (208) 373-0502

Please see instructions on page 2 before filling out the form.

IDENTIFICATION		
Company Name: U.S. Department of Energy Idaho Operations Office	Facility Name: Idaho National Laboratory (INL) Idaho Nuclear Technology and Engineering Center	Facility ID No: 023-00001, 011-00022
Brief Project Description:	Operate Standby Air Compressor	

EXEMPTION

Please refer to IDAPA 58.01.01.222.01.c and d for a list of internal combustion engines that are exempt from the Permit to Construct requirements.

ENGINE (EMISSION UNIT) DESCRIPTION AND SPECIFICATIONS

1. Type of Unit ☐ New Unit ☒ Unpermitted Existing Unit ☐ Modification to a unit with Permit #: Date Issued:		
2. Use of Engine: ☒ Normal Operation ☒ Emergency ☒ Back-up ☐ Other:		
3. Engine ID Number: COM-UTI-616	4. Rated Power: ☒ 460 Brake Horsepower(bhp) ☐ Kilowatts(kW)	
5. Construction Date: February 1997	6. Manufacturer: Cummins	7. Model: N14-C
8. Date of Modification (if applicable): Not Applicable	9. Serial Number (if available): ARP-530-068	10 Control Device (if any): None

FUEL DESCRIPTION AND SPECIFICATIONS

11. Fuel Type	☒ Diesel Fuel (#2) (gal/hr)	☐ Gasoline Fuel (gal/hr)	☐ Natural Gas (cf/hr)	☐ Other Fuels (unit:)
12. Full Load Consumption Rate	23.6 (see note below)			
13. Actual Consumption Rate	Not Available			
14. Sulfur Content wt%	0.5%	N/A	N/A	

OPERATING LIMITS & SCHEDULE

15. Imposed Operating Limits (hours/year, or gallons fuel/year, etc.):
5000 hours/year

16. Operating Schedule (hours/day, months/year, etc.):
As required, up to 24 hours/day, 12 months/year

Note: gal/hr= [(7,000 Btu/hp-hr) x (460 hp)] / [(19,300 Btu/lb) x (7.08 lb/gal)] = 23.6 gal/hr

DEQ AIR QUALITY PROGRAM
1410 N. Hilton
Boise, ID 83706
For assistance: (208) 373-0502

PERMIT TO CONSTRUCT APPLICATION

IDENTIFICATION		
Company Name:	Facility Name:	Facility ID No:
U.S. Department of Energy Idaho Operations Office	Idaho National Laboratory (INL) - Idaho Nuclear	023-00001, 011-
Brief Project Description: Operate Standby Air Compressor		

APPLICABILITY DETERMINATION

1. Will this project be subject to 1990 CAA Section 112(g)? (Case-by-Case MACT)	☒ NO	☐ YES*	☐ DON'T KNOW
	* If YES then applicant must submit an application for a case-by-case MACT determination [IAC 567 22-1(3)"b" (8)]		
2. Will this project be subject to a New Source Performance Standard? (40 CFR part 60)	☒ NO	☐ YES*	☐ DON'T KNOW
	*If YES please identify sub-part: _____		
3. Will this project be subject to a MACT (Maximum Achievable Control Technology) regulation? (40 CFR part 63) THIS ONLY APPLIES IF THE PROJECT EMITS A HAZARDOUS AIR POLLUTANT – SEE TABLE A FOR LIST	☒ NO	☐ YES*	☐ DON'T KNOW
	*If YES please identify sub-part: _____		
4. Will this project be subject to a NESHAP (National Emission Standards for Hazardous Air Pollutants) regulation? (40 CFR part 61)	☒ NO	☐ YES*	☐ DON'T KNOW
	*If YES please identify sub-part: _____		
5. Will this project be subject to PSD (Prevention of Significant Deterioration)? (40 CFR section 52.21)	☒ NO	☐ YES	☐ DON'T KNOW
6. Was netting done for this project to avoid PSD?	☒ NO	☐ YES*	☐ DON'T KNOW
	*If YES please attach netting calculations		

IF YOU ARE UNSURE HOW TO ANSWER ANY OF THESE QUESTIONS CALL 1-208-373-0502

	DEQ AIR QUALITY PROGRAM 1410 N. Hilton Boise, ID 83706 **For assistance: (208) 373-0502**	**PERMIT TO CONSTRUCT APPLICATION**
Company Name:	U.S. Department of Energy Idaho Operations Office	
Facility Name:	Idaho National Laboratory (INL) - Idaho Nuclear Technology and Engineering Center	
Facility ID No.:	023-00001, 011-00022	
Brief Project Description:	Operate Standby Air Compressor	

SUMMARY OF EMISSIONS INCREASE (PROPOSED PTE - PREVIOUSLY MODELED PTE) - POINT SOURCES

		3.											
1.	2.	PM_{10}		SO_2		NO_X		CO		VOC		Lead	
Emissions units	**Stack ID**	**lb/hr**	**T/yr**	**lb/hr**	**T/yr**	**lb/hr**	**T/yr**	**lb/hr**	**T/yr**	**lb/hr**	**T/yr**	**lb/hr**	**T/yr**
Point Source(s)													
COM-UTI-616[a]	616-004	1.01	2.53	0.94	2.36	14.26	35.65	3.07	7.68	1.16	2.89		
(insert more rows as needed)													
Total		1.01	2.53	0.94	2.36	14.26	35.65	3.07	7.68	1.16	2.89	0.00	0.00

a. Tons/year emissions based on 5,000 hours per year operating limit

	DEQ AIR QUALITY PROGRAM 1410 N. Hilton Boise, ID 83706 **For assistance: (208) 373-0502**	**PERMIT TO CONSTRUCT APPLICATION**

Company Name:	U.S. Department of Energy Idaho Operations Office
Facility Name:	Idaho National Laboratory (INL) - Idaho Nuclear Technology and Engineering Center
Facility ID No.:	023-00001, 011-00022
Brief Project Description:	Operate Standby Air Compressor

SUMMARY OF AIR IMPACT ANALYSIS RESULTS - CRITERIA POLLUTANTS

		1.		2.	3.	4.		5.
Criteria Pollutants	**Averaging Period**	**Significant Impact Analysis Results (µg/m3)**	**Significant Contribution Level (µg/m3)**	**Full Impact Analysis Results (µg/m3)**	**Background Concentration (µg/m3)**	**Total Ambient Impact (µg/m3)**	**NAAQS (µg/m3)**	**Percent of NAAQS**
PM_{10}	24-hour	2.70	5				150	
	Annual	0.30	1				50	
SO_2	3-hr	5.70	25				1,300	
	24-hr	2.50	5				365	
	Annual	0.30	1				80	
NO_2	Annual	0.13	1				100	
CO	1-hr	20.70	2,000				10,000	
	8-hr	14.50	500				40,000	

	DEQ AIR QUALITY PROGRAM 1410 N. Hilton Boise, ID 83706 **For assistance: (208) 373-0502**	**PERMIT TO CONSTRUCT APPLICATION**
Company Name:	U.S. Department of Energy Idaho Operations Office	
Facility Name:	Idaho National Laboratory (INL) - Idaho Nuclear Technology and Engineering Center	
Facility ID No.:	023-00001, 011-00022	
Brief Project Description:	Operate Standby Air Compressor	

POINT SOURCE STACK PARAMETERS

1.	2.	3a.	3b.	4.	5.	6.	.7	8.	9.	10.
Emissions units	**Stack ID**	**UTM Easting (m)**	**UTM Northing (m)**	**Base Elevation (m)**	**Stack Height (m)**	**Modeled Diameter (m)**	**Stack Exit Temperature (K)**	**Stack Exit Flowrate (acfm)**	**Stack Exit Velocity (m/s)**	**Stack orientation (e.g., horizontal, rain cap)**
Point Source(s)										
COM-UTI-616	616-004	343,819.00	4,826,086.00	1,499	2.00	0.15	273.00	0.38	0.01	Vertical